

Claims

1. A method for communicating data in a time division multiple access system where the data (PL, RF) is transmitted wirelessly between stations (MS1-MS6; BS1-BS3) in time slots (s(i)), the time slots (s(i)) being organized in frames (F(i)) of a repeating frame structure (F₁, F₂, F₃), the stations (MS1-MS6; BS1-BS3) selecting time slots (s(i)) for transmission of data (PL, RF) according to a self-organizing transmission algorithm which allows a first station (MS1) to reuse a time slot that is allocated to a second station (MS2-MS6, BS2, BS3), the method involving:

transmitting an addressed message (M^{M1}_{Adr}) from a first base station (BS1) to a mobile station (MS1),

transmitting, in response to the addressed message (M^{M1}_{Adr}), an acknowledgement message (Ack^{M1}_{B1}) from the mobile station (MS1), and

repeating the transmission of the addressed message (M^{M1}_{Adr}) from the first base station (BS1) to the mobile station (MS1) until either a message handling entity (MHE) being responsible for the transmission of the addressed message (M^{M1}_{Adr}) has received the acknowledgement message (Ack^{M1}_{B1}) or a maximum number (n_{max}) of retransmissions has been performed,

characterized by

receiving the acknowledgement message (Ack^{M1}_{B1}) in a second base station (BS2),

forwarding the acknowledgement message (Ack^{M1}_{B1}) from the second base station (BS2) to the message handling entity (MHE), the message handling entity (MHE) being connected to a network (N) to which both the first base station (BS1) and the second base station (BS2) are connected, either directly or via at least one intermediate node, and

receiving the acknowledgement message (Ack^{M1}_{B1}) in the message handling entity (MHE) via the network (N).

2. A method according to claim 1, **characterized by** forwarding the acknowledgement message (Ack^{M1}_{B1}) via the network

(N) to the message handling entity (MHE) within the first base station (BS1).

3. A method according to claim 1, **characterized by** forwarding the acknowledgement message (Ack^{M1}_{B1}) via the network
5 (N) to a node in the network (N) which is separated from the first base station (BS1).

4. A method according to any one of the preceding claims, **characterized by** the self-organizing transmission algorithm only
10 permitting the first station (MS1) to reuse a time slot ($s(i)$) allocated to a base station (BS2, BS3) if the base station (BS2, BS3) is located outside a threshold distance (D_{th}) from the first station (MS1).

5. A method according to claim 4, **characterized by** the self-organizing transmission algorithm permitting the first station
15 (MS1) to reuse a time slot ($s(i)$) allocated to a mobile station (MS2-MS6) that is located at any distance from the first station (MS1).

6. A method according to any one of the claims 4 or 5, **characterized by** the first station (MS1) being a mobile station.

20 7. A computer program directly loadable into the internal memory of a digital computer, comprising software for accomplishing the steps of any of the claims 1 - 6 when said program is run on a computer.

8 A computer readable medium, having a program recorded
25 thereon, where the program is to make a computer accomplish the steps of any of the claims 1 - 6.

9. A message handling entity (MHE) for controlling data communication between at least one base station (BS1, BS2) and at least one mobile station (MS1-MS4) in a time division multiple access system where the data is transmitted wirelessly between the stations (MS1-MS6; BS1-BS3) in time slots (s(i)), the time slots (s(i)) are organized in frames (F(i)) of a repeating frame structure (F₁, F₂, F₃), the stations (MS1-MS6; BS1-BS3) select time slots (s(i)) for transmission of data (PL, RF) according to a self-organizing transmission algorithm which allows a first station (MS1) to reuse a time slot that is allocated to a second station (MS2-MS6, BS2, BS3), comprising:

a memory area (850) adapted to hold status information pertaining to an addressed message (M^{M1}_{Adr}) sent from a first base station (BS1) to a particular mobile station (MS1),

an interface (860) towards a network (N) adapted to

send a control message (C^{M}_{MS1}) ordering the first base station (BS1) to transmit an addressed message (M^{M1}_{Adr}) to the mobile station (MS1),

receive an acknowledgement message (Ack^{M1}_{B1}) from a second base station (BS2), the acknowledgement message (Ack^{M1}_{B1}) having been generated by the mobile station (MS1) in response to the addressed message (M^{M1}_{Adr}) and sent to the second base station (BS2), and

forward the acknowledgement message (Ack^{M1}_{B1})

for processing in the message handling entity (MHE), and a central unit (840) adapted to

order retransmission of the addressed message (M^{M1}_{Adr}) from the first base station (BS1), if after a pre-determined interval (T'_{Ret}) from the transmission of the addressed message (M^{M1}_{Adr}), the status information remains intact in the memory area (850),

order repeated retransmission a maximum number of times (n_{max}), and

receive the acknowledgement message (Ack^{M1}_{B1}), and in response thereto, clear the status information in the memory area (850).

10. A base station (BS1) for communicating data with at least one other station (MS1-MS4) in a time division multiple access system where the data is transmitted wirelessly between the stations (MS1-MS6; BS1-BS3) in time slots (s(i)), the time slots (s(i)) are organized in frames (F(i)) of a repeating frame structure (F₁, F₂, F₃), the stations (MS1-MS6; BS1-BS3) select time slots (s(i)) for transmission of data (PL, RF) according to a self-organizing transmission algorithm which allows a first station (MS1) to reuse a time slot that is allocated to a second station (MS2-MS6, BS2, BS3), comprising

a transmitter (1110) adapted to transmit an addressed message (M^{M1}_{Adr}) to a mobile station (MS1),

a memory area (1150) adapted to hold status information pertaining to the addressed message (M^{M1}_{Adr}),

a receiver (1120) adapted to

receive an acknowledgement message (Ack^{M1}_{B1}) generated by the mobile station (MS1) in response to the addressed message (M^{M1}_{Adr}), and

forward the acknowledgement message (Ack^{M1}_{B1})

for processing in the base station (BS1), and

a central unit (1140) adapted to

retransmit the addressed message (M^{M1}_{Adr}), if after a predetermined interval (T_{Ret}) from the transmission of the addressed message (M^{M1}_{Adr}), the status information remains intact in the memory area (1150),

repeat the retransmission a maximum number of times (n_{max}), and

receive the acknowledgement message (Ack^{M1}_{B1}), and in response thereto, clear the status information in the memory area (1150),

characterized in that it comprises:

an interface (1160) towards a network (N) to which at least one other base station (BS2) is connected, the interface (1160) being adapted to receive acknowledgement messages (Ack^{M1}_{B1}) from the at least one other base station (BS2) and forward any such messages to the central unit (1150).

11. A base station (BS1) according to claim 10, **characterized in that** the receiver (1120) is adapted to receive acknowledgement messages (Ack^{M4}_{B2}) in respect of at least one other base station (BS2), and the interface (1160) is further adapted to
- 5 forward acknowledgement messages (Ack^{M4}_{B2}) received in respect of the at least one other base station (BS2) to the respective at least one other base station (BS2) via the network (N).